CLAIMS

- 1. A search engine system, comprising:
 - a memory bank coupled to a bank selection signal;
- a plurality of mask logic blocks, wherein each mask logic block is configured to receive a constructed key and an incoming key mask and to provide a masked key;
- a plurality of hash function blocks, wherein each hash function block is configured to receive at least two of the masked keys and to provide at least three hash function outputs; and
- a multiplexer configured to receive a plurality of hash function outputs and to provide the bank selection signal.
- The search engine system of claim 1, wherein:
 the memory bank includes memory that is substantially static random access memory
 (SRAM) type.
- 3. The search engine system of claim 1, wherein:
 the memory bank is arranged as a plurality of buckets, wherein each bucket includes a plurality of entries.
- 4. The search engine system of claim 3, wherein:
 the bank selection signal is configured to select one of the plurality of buckets.
- 5. The search engine system of claim 3, wherein:
 each of the plurality of entries includes a stored key pattern field, a local mask field, and a
 hash function indication field.
- 6. The search engine system of claim 1, wherein: the constructed key includes information from a packet header.
- 7. The search engine system of claim 1, wherein:
 each of the plurality of mask logic blocks includes a logical-AND type function.
- 8. The search engine system of claim 1, wherein:
 each of the plurality of hash function blocks includes:
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a first hash function generator configured to receive a first masked key and to provide a first hash function output;

a second hash function generator configured to receive a second masked key and to provide a second hash function output; and

a third hash function generator configured to receive the first masked key and the second masked key and to provide a third hash function output.

- 9. The search engine system of claim 8, wherein: the third hash function output is configured for a concatenated key type search.
- 10. The search engine system of claim 8, wherein:each of the first, second, and third hash function generators includes a Cyclic RedundancyCode (CRC) type function.
- 11. The search engine system of claim 1, wherein:
 the multiplexer is configured to receive at least eight hash function outputs.
- 12. The search engine system of claim 11, wherein:
 the at least eight hash function outputs includes outputs from at least four different hash function blocks.
- 13. The search engine system of claim 9, wherein:
 the concatenated key type search includes a same address selection in a first memory bank
 and a second memory bank.
- 14. The search engine system of claim 5, further comprising:
 a comparator configured to provide a match indication for each of the plurality of entries in response to a comparison between the constructed key and the stored key pattern.
- 15. The search engine system of claim 14, wherein:
 the comparator includes an AND-function block configured to provide a masking of the constructed key by applying the local mask field.

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16. The search engine system of claim 12, wherein:

the multiplexer is configured to select a different one of the outputs from the at least four different hash function blocks in response to a clock signal.

17. The search engine system of claim 3, wherein:

in a first mode, each of the plurality of entries is configured to be responsive to any of the plurality of hash function outputs; and

in a second mode, each of the plurality of entries is configured to be responsive to a designated one of the plurality of hash function outputs.

18. A method of searching a table, comprising the steps of:

constructing a plurality of keys;

performing a key masking on each of the plurality of keys to provide a plurality of masked keys;

performing a hashing on each of the plurality of masked keys;

determining if a system is in a shared mode;

if the system is in the shared mode, sharing a plurality of hash functions for an entry of a memory bank;

if the system is not in the shared mode, hard configuring the hash functions for the entry of the memory bank;

selecting a bucket from the memory bank;

applying a local mask;

performing a comparison to provide one or more match indications; and determining a precedence from among the one or more match indications.

19. The method of searching the table of claim 18, wherein: the constructing the plurality of keys includes getting information from a packet.

20. The method of searching the table of claim 18, wherein: the performing the hashing includes using a Cyclic Redundancy Code (CRC) type function.

21. A means for searching a table, comprising:

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- a means for constructing a plurality of keys;
- a means for performing a key masking on each of the plurality of keys to provide a plurality of masked keys;
 - a means for performing a hashing on each of the plurality of masked keys;
 - a means for determining if a system is in a shared mode;

if the system is in the shared mode, a means for sharing a plurality of hash functions for an entry of a memory bank;

if the system is not in the shared mode, a means for hard configuring the hash functions for the entry of the memory bank;

- a means for selecting a bucket from the memory bank;
- a means for applying a local mask;
- a means for performing a comparison to provide one or more match indications; and
- a means for determining a precedence from among the one or more match indications.

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